Wochenbericht Poseidon cruise POS520

Investigating deep water column biodiversity and ecology of the Cape Verde Islands

Weekly report 14/2/2018-21/2/2018

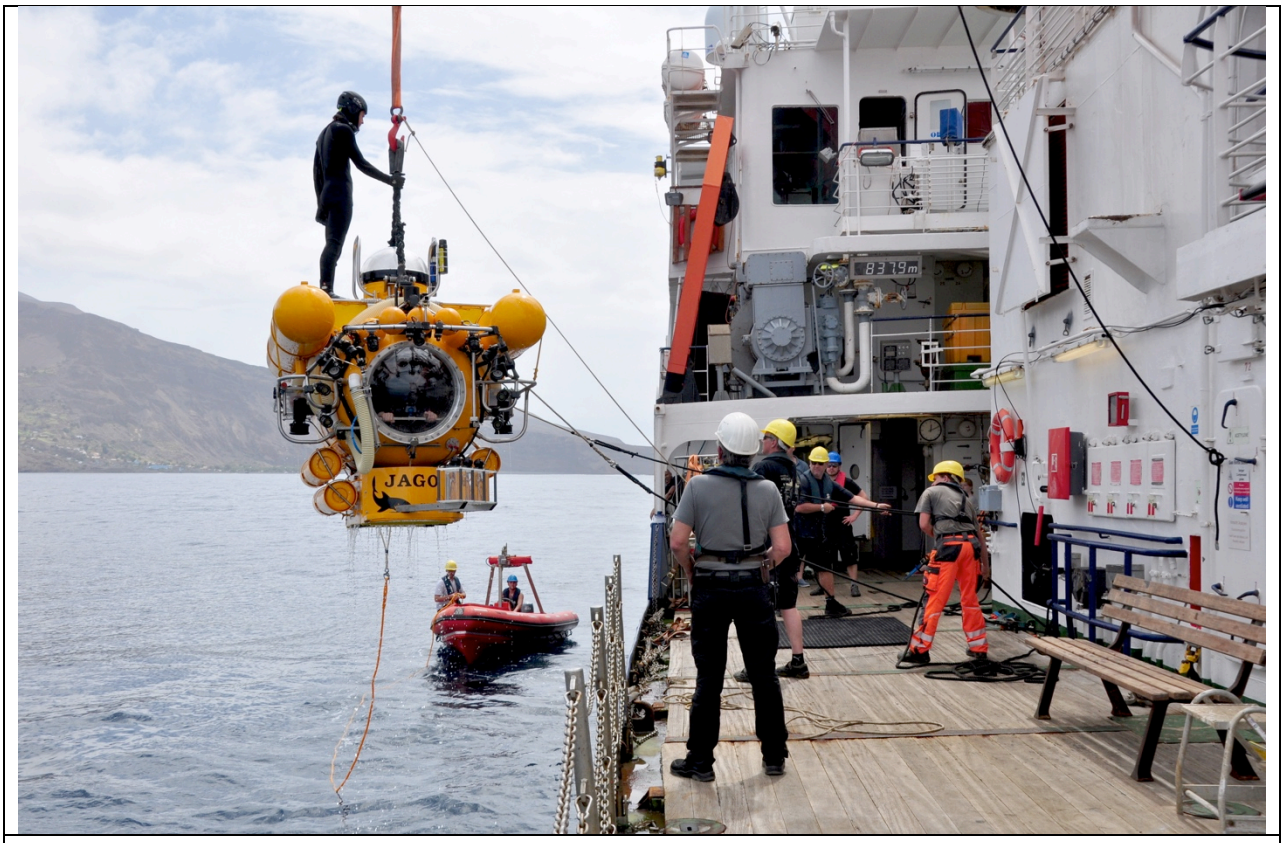
On February 15 the research vessel Poseidon and its captain and crew, together with a multidisciplinary scientific team set sail from Mindelo to the first station in the Bay of Tarrafal off Santo Antao (16° 58.441' N 25° 20.727' W) to start a deep-sea biological research program around the Cape Verde Islands. While we were originally scheduled to leave the port on February 14th, a delay in the arrival of scientific equipment made us decide to postpone the cruise departure for 24 hours. The results of the equipment were definitely worth waiting for since it allows us to make detailed photographs of organisms. The photographic documentation of recently captured deep-sea animals is important, especially when the chance of collecting undescribed species is high. This is particularly true when investigating the biology of the deep sea (waters > 200 m).

The Cape Verde Islands are an ideal location for deep-sea research since the islands rise from a seafloor of more than 4000 m depth. Some of the islands, like Santo Antao and Fogo, are characterized by very steep submarine slopes. The deep sea is therefore close to shore. At the same time, working close to shore provides in most cases calmer conditions, as a result of the shelter provided by the high topography of the volcanic islands.

From the departure day up to now we have had seven very successful days of testing and data collection with our instruments, and data is being collected almost 24 hours per day. On POS520 we deploy a variety of instruments, which together allow us to perform video surveys and animal collections from the surface down to 3000 m. Environmental sensors on the instruments allow the correlation between biology and physical and chemical oceanography.

One of the instruments is the manned submersible JAGO. The JAGO can dive down to 400 m, above deeper water down to 350 m and is equipped with a high definition camera, allowing detailed video recordings of marine animals. In addition, the JAGO-team designed and built especially for this cruise new collection devices for animals that live in the water column. One type of collection device is also referred to as the ‘jelly scoop’, and involves a cylindrical acrylic tube that can be held by the manipulator arm and allow the collection of living organisms such as ctenophores, siphonophores and medusae by positioning the tube around an animal and bringing the tube back into a holder. This type of non-intrusive capture devices are necessary because most gelatinous zooplankton organisms cannot be captured intact using nets, due to

their fragile body structure. Gelatinous zooplankton are particularly abundant in the deep sea, but we are only at the beginning of understanding the ecology of this important group of organisms. Obtaining information on the vertical distribution, diversity, behavior and abundance of midwater communities including gelatinous zooplankton, and how these compare to pelagic communities in other oceans are among the main goals of our cruise. To achieve these goals we have invited international experts to join our cruise.



GEOMAR's research submersible JAGO recovered after a dive off Santo Antao

Another method we use to perform deep-sea video surveys is the pelagic in situ observation system or PELAGIOS. This instrument was built at GEOMAR and is a camera system that is towed horizontally by the vessel at slow speed to perform pelagic video transects. By towing PELAGIOS at different depths, we collect video of the animals in the water column. Identification of animals in the video results in high resolution vertical depth distribution data. During POS520 we deploy PELAGIOS down to 2500 m, a record depth for this instrument. We perform day and night video transects with PELAGIOS and JAGO to better understand the daily migration which many pelagic organisms undertake. To collect organisms that we see with the PELAGIOS we deploy nets that we can close at a particular depth. The combination of in situ

observations (JAGO, PELAGIOS), net catches and exact data on salinity, oxygen and temperature enable the reconstruction of the habitat of deep-sea animals.

After leaving Mindelo, the first station we visited was the Bay of Tarrafal. Here we met with a team of photographers whose mission was to document the first days of JAGO operations. We performed so far seven JAGO dives and seven PELAGIOS deployments, in addition to multiple net surveys. We are currently on our way to Fogo, the next island of our expedition, and an active volcano. We plan to continue with performing a JAGO dive in the morning and in the evening to document differences in day and night distribution patterns. Although we were sad to leave the beautiful, calm Bay of Tarrafal, which provided ideal conditions for JAGO operations, we are also excited to see how the water column communities off Fogo compare to our observations and data from Santo Antao.

Everybody on board is in good spirits, the working atmosphere among the science party and the crew is excellent and we all enjoy being on board the POSEIDON. The vessel once again proved to be a very suitable working platform for this type of multidisciplinary and multigear operation.